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Introduction

Whiskeytown National Recreation Area is managed by the National Park Service. It is located in Shasta County, California about 8 miles (13 kilometers) west of downtown Redding (Figure 1). The park contains approximately 42,500 acres (17,000 hectares) of land and water. Elevations range from 800 feet (250 meters) in lower Clear Creek below Whiskeytown Dam to over 6,200 feet (1,900 meters) atop Shasta Bally. Vegetation in the lower elevations consists of oak woodlands and chaparral; mixed conifer in mid elevations and mixed conifer- old growth forest in higher elevations. Most of the mid- elevation mixed conifer forest is second growth resulting from logging between the 1940s to early 1970s. Whiskeytown Lake, created by the earth- filled Whiskeytown/Clair A. Hill Dam on Clear Creek, has a surface area of about 3,200 acres (1,300 hectares).

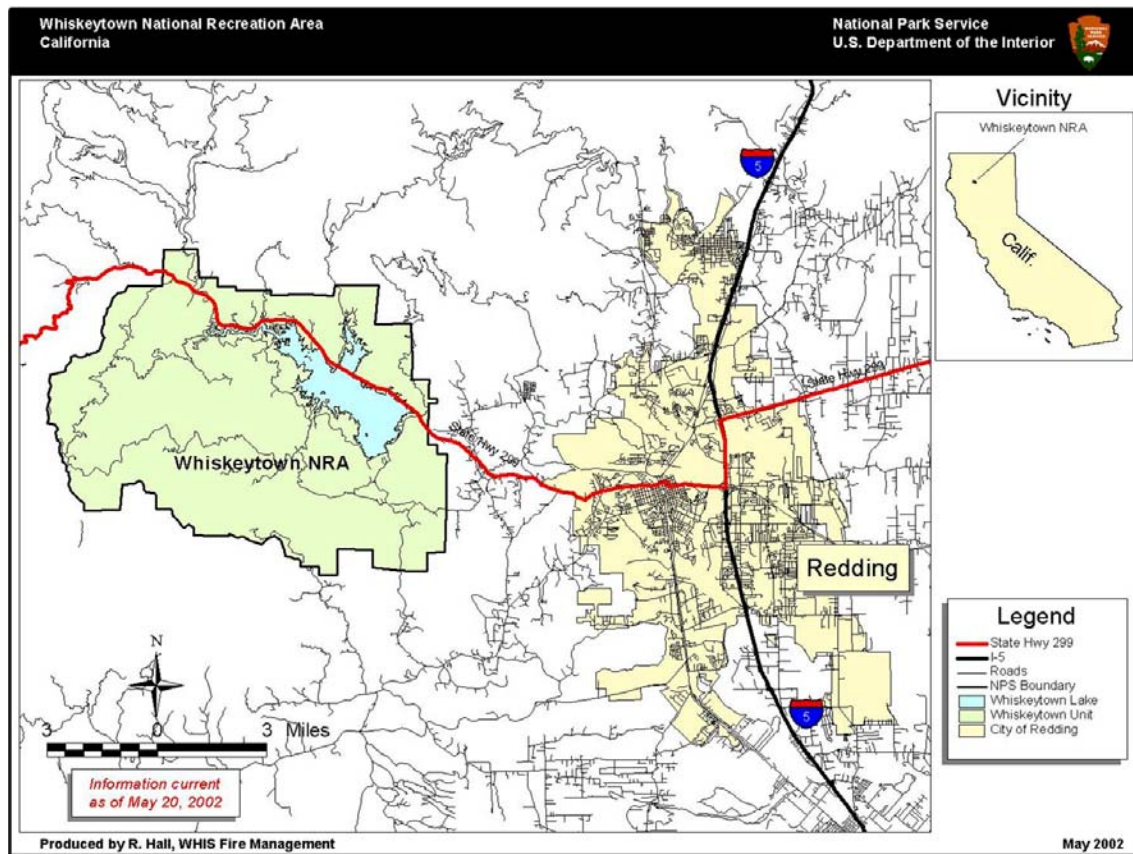


Figure 1: Vicinity Map of Whiskeytown NRA

Whiskeytown was established by the Act of November 8, 1965 “...to provide, for the public outdoor recreation use and enjoyment of the Whiskeytown reservoir and surrounding lands...by present and future generations and the conservation of scenic, scientific, historic and other values contributing to public enjoyment of such lands and waters.” Whiskeytown Lake provides high quality reservoir recreation opportunities because of its forested mountain setting and clear water. The reservoir is kept full throughout the summer months. The park has an average visitation of about 700,000 visitors per year. Visitation levels can soar in dry years when other nearby reservoirs are severely drawn down. The Bureau of Reclamation manages the power and water supply functions of Whiskeytown Dam and Reservoir. The National Park Service manages all other facilities within the recreation area including all lands, streams, and associated forest.

Declining fisheries in the Pacific Northwest and northern California necessitate protection and enhancement of habitat and restoration of critical watersheds. Clear Creek below Whiskeytown Dam has been identified as vitally important fisheries habitat for federally listed steelhead and salmon. Estimates within lower Clear Creek indicate that with basic watershed restoration measures lower Clear Creek could potentially contribute as much as six percent to the total population of anadromous fish within the entire Sacramento River watershed (WSRCD 1996). Fine sediment reduction is recognized as one of the basic watershed restoration methods to enhance spawning habitat in lower Clear Creek.

The Watershed and Trail Improvement project is designed to reduce sediment loads to lower Clear Creek through restoration of the Orofino Creek watershed, a major tributary to lower Clear Creek. A combination of road removal, trail restoration, and trail construction in the Orofino Creek watershed would reduce the sediment load to lower Clear Creek and provide for a better visitor experience at the park. To further improve the park's trail system, new construction of a trail segment in an adjacent watershed (Salt Creek) is also proposed. The work that is proposed in Salt Creek watershed is similar to the work proposed in the Orofino Creek watershed.

Federal land managing agencies are required to identify and negate, minimize, or mitigate adverse effects to historic properties in consultation with Federal, State, Local, and Tribal governments/organizations, while engaged in any undertaking with the potential to affect historic properties (36 CFR Part 800). Federal regulations provide for coordination of compliance with Section 106 of the National Historical Preservation Act of 1966 (NHPA), as amended and NEPA (36 CFR Part 800.8). Strategies employed in development of this document are consistent with standards set forth in federal regulations for developing environmental documents to comply with Section 106 of NHPA (36 CFR Part 800.8 [c][1]).

Purpose and Need

The National Park Service Management Policies (2001) state that each park will strive to manage their landscapes in a manner that most closely approximates natural functioning ecosystem processes. It is also National Park Service policy to cooperate with other land managers, non-profit organizations, and user groups to facilitate local and regional trail access to parks—including access to other adjacent public lands. In addition, Whiskeytown's General Management Plan (1999) states that it is the goal of the park to restore the non-developed areas of the park to the naturally occurring processes and landscapes of the early 1800s. The hydrology of the Orofino Creek watershed, though impacted by historic activities, retains a high degree of integrity and presents the park with a very good opportunity for restoration work. The park General Management Plan also states that it is the park's goal to provide an integrated network of designated backcountry trails.

The highest elevation in the Clear Creek watershed is found in Whiskeytown on Shasta Bally at 6209 feet (1892 meters). The lowest elevation is 425 feet (130 meters) at the confluence of Clear Creek and the Sacramento River. Hydrologically, Clear Creek is recognized as two segments, lower Clear Creek and upper Clear Creek, divided by the Clair A. Hill Whiskeytown Dam within the park. The Clear Creek Canyon below Whiskeytown Dam has been nominated for inclusion in the National Wild and Scenic Rivers System. The lower Clear Creek watershed below Whiskeytown Dam consists of approximately 30,000 acres (12,146 hectares), 10,000 acres (4,049 hectares) of which lie within the boundary of the park.

The Lower Clear Creek Watershed Analysis recommended upland watershed restoration projects that would decrease sediment discharge into creeks:

The majority of roads in the upper watershed are unimproved or paved with gravel. Many of these roads are composed of highly erodible material and are ineffectively graded to control erosion. In steep areas...large volumes of high-velocity runoff water can seriously erode these roads, cutbank, and fill surfaces. In addition, many of the road culverts are improperly sized or improperly spaced to provide sufficient drainage. ...a variety of techniques could be used to improve drainage including outsloping, establishing rolling dips and water bars, or installing culverts with overbank flumes and energy dissipaters (WSRCD 1996).

Preliminary survey of Whiskeytown by geomorphologist indicates that the primary source of erosion and subsequent sedimentation is the road network. Most of Whiskeytown has been impacted by mining, logging, dam building, construction, utility easements, and highway construction and maintenance. Air photos have revealed hundreds of miles of old logging and mining roads. The most significant disturbances are the result of roadways, skid trails, and landings associated with past logging activities. Roads built to access harvest areas were inadequately designed and constructed for temporary reasons without consideration of the hydrology of the area or the disruption of natural drainage patterns. Fill material was often placed in stream channels and swales. Water transported through these drainages during winter storms continues to erode the fill material in its path. Roads not currently eroding may begin to erode as a result of catastrophic wildfire or major storm events. Sediments impacting lower Clear Creek are caused by upland erosion—a significant portion of which is occurring within the boundaries of the park (WSRCD 1996). The park's implementation of a watershed restoration program began with the demonstration 300-acre Paige-Bar watershed project, which was completed in 1998. This project was followed by the Pope-Ericson Road Removal project in 2000, and the Peltier Valley Road and Peltier Trail restoration project completed in 2001.

Orofino Creek (Figure 2) is a small tributary delivering a high sediment load to lower Clear Creek. A major source of the sediment to Orofino Creek is produced by erosion of an old mining roads and water ditches which are maintained as a trail system. The trails within this system are the Mt. Shasta Mine Loop Trail and the Clear Creek Canal Trail. Another component of the system is the Pope-Ericson Road which was partially removed in 2000 as an emergency stabilization project and the removal of the final segment of the road is proposed as part of this project.

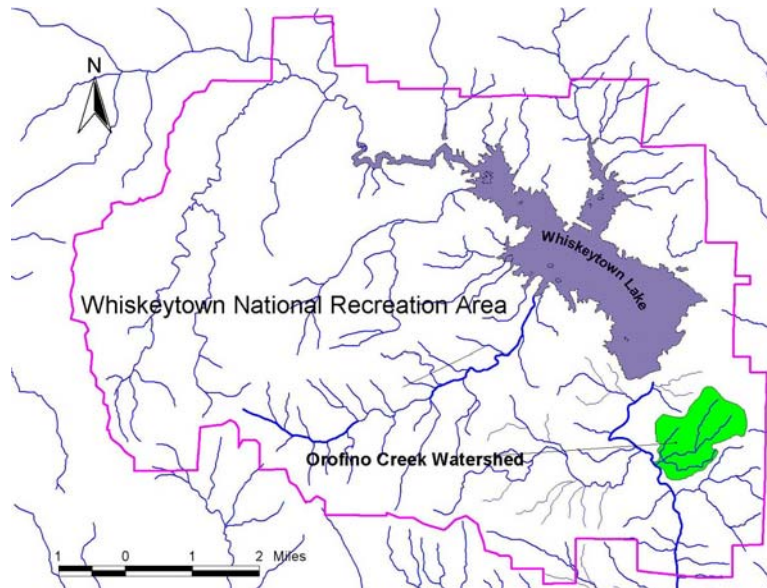


Figure 2: Orofino Creek Watershed in Whiskeytown NRA

A portion of this project proposes remediation of the erosional factors associated with the Mt. Shasta Mine Loop and the Clear Creek Canal Water Ditch hiking trails. One objective is to restore natural hydrologic conditions on lands within the watershed that have been altered by human activity. The remainder of this project is to create a connecting trail from Bureau of Land Management (BLM) property adjacent to the southeast section of the park into the Whiskeytown Trails System. The Salt Creek Trail in the Salt Creek drainage, lies to the south of the Orofino Creek drainage and is the closest park trail to the BLM trails system (Figure 2a). The objective behind this portion of the project is to develop a connector trail between the BLM and the park's trails systems as envisioned in a concept plan for a Shasta- Trinity Trail. The Shasta- Trinity Trail concept was prepared as a long- distance trail extending from the Sacramento River, through Whiskeytown, and on to the Trinity Alps Wilderness Area managed by the US Forest Service. This section of trail was included the impacts and affected environment are consistent with the Watershed Restoration and Trail Improvement project. Further public scoping and environmental compliance is needed to adequately plan for the entire Shasta- Trinity Trail within the park, and will be the subject of a forthcoming environmental assessment.

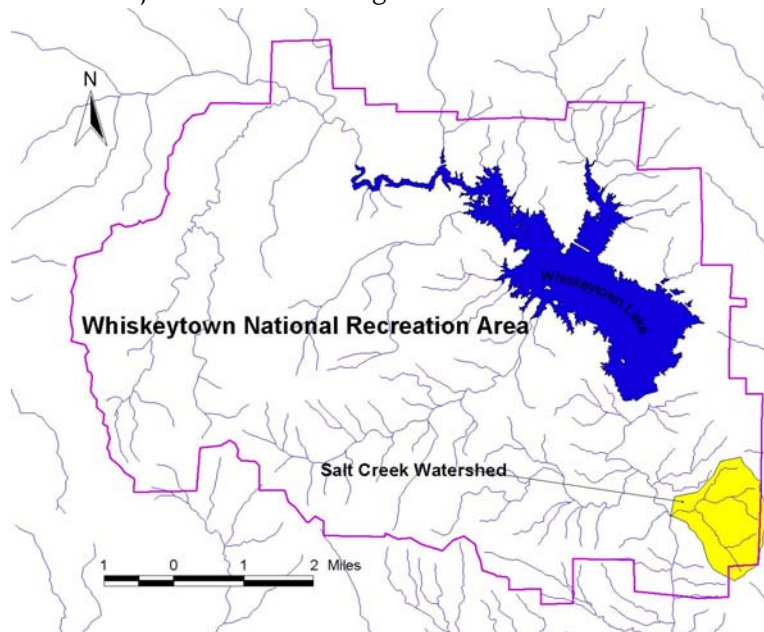


Figure 2a: Salt Creek Watershed in Whiskeytown NRA

The Orofino Creek Watershed Restoration portion of this project (Figure 3) is an effort to reduce unnatural sedimentation to lower Clear Creek resulting from erosion of the remaining segment of Pope- Ericson Road, as well as the Mt. Shasta Mine Loop and Clear Creek Water Ditch trails. The Mt. Shasta Mine Loop Trail is a combination of road grade and constructed trail. The Clear Creek Canal Water Ditch trail at one point provided miners with water for their mining operations. Over the years, lack of regular maintenance has resulted in a filled- in and breached ditch. Water crossings along the ditch are, in many cases, diverted onto the surface of the trail. This water pools and runs along the contour where it eventually erodes sections of the trail and hillside. In other segments of the trail, water crossings have eroded away the ditch formation entirely, requiring hikers to follow steep descents and ascents in order to continue along the contour- hugging trail.

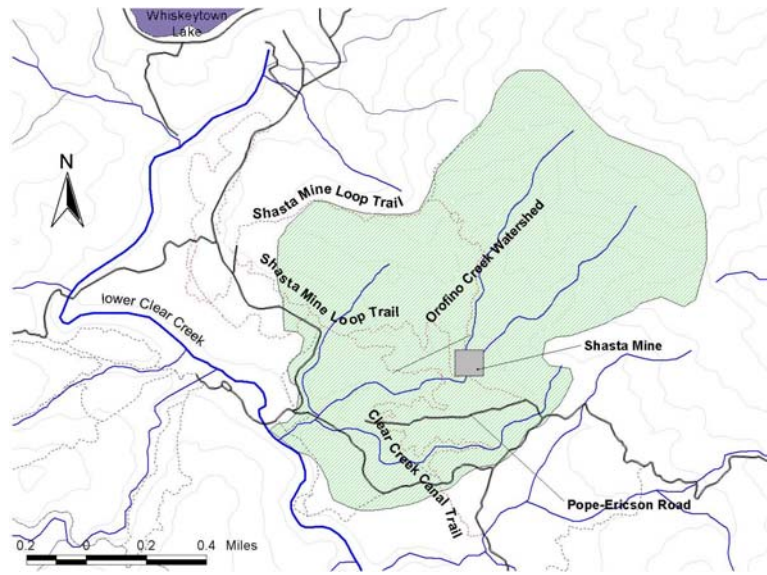


Figure 3: Orofino Creek Watershed Restoration Area

Orofino Creek and Salt Creek drainages are both sub-watersheds of the Clear Creek Watershed, which is approximately 35 miles (56 km) long, ranges from 5 miles (8 km) to 12 miles (19 km) wide and covers 154,820 acres (62,680 hectares). The federal government is the largest landholder (68%) in the watershed with 105,560 acres (42,737 hectares): the National Park Service administers 42,503 acres (17,208 hectares) in Whiskeytown National Recreation Area, the Bureau of Land Management administers 37,760 acres (15,287 hectares), and the U.S. Forest Service administers 25,600 acres (10,364 hectares). The largest private owners are timber corporations with approximately 18,600 acres (7,530 hectares) and other individual holdings comprise about 10,000 acres (4,048 hectares). The State of California and the City of Redding administer small amounts of public land, principally in the lower reaches of the watershed. The community of French Gulch and surrounding rural residential areas, within the upper reach of Clear Creek, occupy about 800 acres (324 hectares). The lower Clear Creek area includes some rural residential and industrial commercial properties.

The Orofino Creek watershed also contains at least seven known abandoned gold mines. One small (100 cubic yards) mine tailing pile and one large (50,000 cubic yards) mine tailing pile are associated with the disturbance. The largest site, called the Mt. Shasta Mine, processed gold on site with an eight-stamp mill that could crush up to 50 tons of ore per day. The presence of the stamp mill implies the potential for mercury contamination within the tailing piles and possibly within Orofino Creek and its tributaries resulting from the use of mercury to process gold ore. The tailings are also a large source of sediment and a historical feature of the Mt. Shasta Mine. Removal of these tailings piles will potentially compromise the historic integrity of the Mine Site and such work is well beyond the scope and funding of this project. What is proposed in this project is to determine if the tailings are contaminated with mercury for future management actions.

The Whiskeytown trails system in the southeast portion of the park includes the following trails (see Figure 3a): Salt Creek Trail, Buck Hollow, Clear Creek Canal Trail, Mt. Shasta Mine Loop Trail and Guardian Rock Trail. Many of these trails were originally constructed as roads or ditches associated with mining, logging and homesteading activities. Since these roads and ditches were not always adequately engineered for both hydrologic crossings and recreational uses, some damage has occurred to both the trails and to the surrounding environment. Park staff must pay close attention to the condition of the trails and to the amount of damage to surrounding areas. There is considerable use of the southeast area trails for hiking, biking and

equestrian use. From the Mt. Shasta Mine Loop parking area, a park visitor could conceivably fully access the entire south portion of the park.

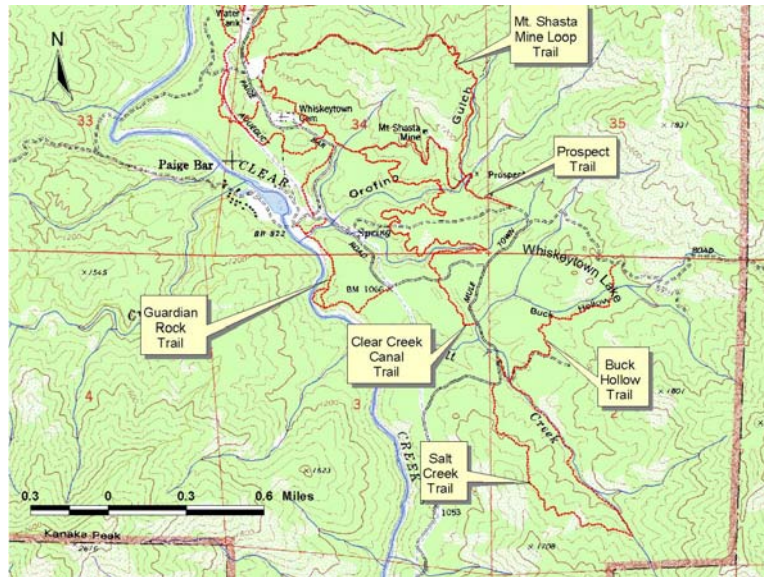


Figure 3a: Whiskeytown Trail System-project area

Work in the Orofino and Salt Creek drainages is being proposed for two primary reasons: first, abatement of the high rate of sediment delivery to lower Clear Creek is a high priority to help improve downstream critical habitat for chinook salmon and steelhead. The watershed restoration portion of the project would use road removal technology developed by the National Park Service (Spreiter 1992) and implemented in previous watershed restoration projects at Whiskeytown. Secondly, the National Park Service, along with the City of Redding, the BLM, the US Forest Service, and stakeholder groups, developed a concept plan for the Shasta- Trinity Trail and the National Park Service has committed to implementing the construction of the trail. The Shasta- Trinity Trail is a long- distance trail that maximizes the currently existing network of trails—through the use of connector trails—from the Sacramento River to the Trinity Alp Wilderness area.

The hydrologic disruptions of roads and trails in the Orofino Creek watershed continue to impact park resources. The park proposes to treat the remaining segment of the Pope- Ericson Road, to improve the Mt. Shasta Mine Loop Trail, to stabilize the Clear Creek Water Ditch trail in a manner that decreases the impacts of historic disturbance, and to provide a connector trail between NPS and BLM trails in the southeast section of the park. Through restoration of some landforms and water- flows to approximate pre- disturbance conditions, the park would be able to reduce erosion and fine sediment transport to lower Clear Creek, thus improving endangered salmon habitat. Trail improvements through watershed restoration efforts and creation of a connector trail with the BLM would improve recreation opportunities within the park and on surrounding public lands.

Other entities associated with watershed restoration work in the lower Clear Creek watershed have accomplished projects such as dam removal (Saeltzer Dam), cobble injection (for salmon breeding habitat) and streambed re- contouring. These efforts are designed to improve salmon habitat and return a more natural stream function to lower Clear Creek. Whiskeytown's watershed restoration efforts would complement these actions since the ultimate limit to salmon breeding habitat and the functioning upper watershed for salmon lie within the boundary of the park (there is no fish ladder at the Whiskeytown/Clair A. Hill Dam). Trails efforts in the surrounding area are facilitated by the Redding Trails and Bikeways Council, a stakeholder group

comprised of equestrian, hiking, and biking enthusiasts. The concept of the Shasta Trinity Trail was facilitated by the National Park Service working with the City of Redding, the Trails and Bikeways Council and other interested members of the public.

Other Considerations

Cumulative effects analyze impacts for the Watershed Restoration and Trail Improvement project in addition to other projects within the area. Other projects include removal of the west section of Pope- Ericson Road, construction of fuel breaks, and BLM trail construction outside of the park boundary.

In August of 2000, a highly erosive section of Pope- Ericson Road was removed in an emergency stabilization project. One- half mile of the western section of the road was removed to reduce erosion impacts to lower Clear Creek. The project area has had three years to stabilize and vegetation is recovering well. The short- term sedimentation produced from this project subsided after the first storms of the first season.

The park has constructed several shaded fuel breaks in the Orofino Creek watershed and adjacent watersheds including Salt Creek. The fuel breaks are constructed by removing all understory vegetation while preserving the overstory. Vegetation is cleared in a 100- foot swath and maintained at that width. Several P- Lines are also constructed with the shaded fuel breaks. The P- Lines are cut through vegetation at a width of fifteen- feet.

Currently, the BLM is constructing a segment of the Shasta- Trinity trail that will connect lands to the west of the park to Whiskeytown. A one- quarter mile section of this trail will be constructed in the Salt Creek watershed leading up to the park boundary. Whiskeytown will complete this trail section with the proposed trail construction within this document. The trail is four- foot wide and constructed by hand crews. Enough vegetation is removed to allow equestrian use, typically eight- foot wide and eight- foot high.

The major goals of the project include:

- Removal of a highly erosive segment of the Mt. Shasta Mine Loop Trail and construction of a new trail to bypass the removed segment;
- Out- sloping road sections of the Mt. Shasta Mine Loop Trail;
- Removal of the remaining segment of Pope- Ericson Road;
- Construct a connector trail between the BLM and NPS trails networks;
- Stabilize and restore water crossings on the Clear Creek Canal Trail; and,
- Sample for mercury in tailings at the Mt. Shasta Mine and Orofino Mine areas.
- Construction of a new segment of trail for the Shasta- Trinity Trail route.

Alternatives

- Four alternatives are considered in this Environmental Assessment including a No Action alternative required by the National Environmental Policy Act (NEPA). Environmental impacts are considered for each alternative, and mitigation proposals are discussed for relevant and foreseeable impacts. Reasonably, foreseeable impacts to resources under each alternative are outlined in the *Environmental Impacts Under All Alternatives* section.

The four alternatives proposed include:

1. No Action Alternative
2. Roads Alternative
3. Trails Alternative
4. Full Restoration Alternative (agency preferred alternative)

These alternatives include taking no- actions to resolve the erosion problems observed in the Orofino Creek watershed. Two alternatives were developed to emphasize work according to features to be restored and improved, such as roads or trails. A final alternative combines all proposed work listed above and prepares the park for future work as funding becomes available.

No Action Alternative

Under this alternative, there would be no proactive management or restoration of the Pope-Ericson Road, the Mt. Shasta Mine Loop Trail, or the Clear Creek Canal Water Ditch Trail. Under this alternative, the temporary increase of erosion and sedimentation due to project work would not occur. Pope- Ericson Road, the Mt. Shasta Mine Loop Trail, and the Clear Creek Canal Water Ditch Trail would continue to be maintained according to current roads and trails maintenance practices. Current erosion and sedimentation would continue. No planned reduction of sediment delivered to streams would occur under this alternative. No connector trail between BLM and NPS trails systems would be constructed. Additionally, the tailings associated with the Mt. Shasta and Orofino mines would not be assessed for the presence of mercury.

Roads Alternative

Under this alternative, the restoration work in the Orofino Creek watershed would focus on the Mt. Shasta Mine Loop Trail and the Pope- Ericson Road – both developed as mining and/or logging roads. Work proposed for the Mt. Shasta Mine Loop Trail would include removal, restoration and re- routing a segment of trail as well as out- sloping (removing the road berm and placing it along the cut bank) and width reduction of the road segments. Additionally, the remaining section of Pope- Ericson Road would be removed and access restricted. No work would commence until National Historic Preservation Act Section 106 compliance (archaeological consultation) had been completed.

Removal and restoration of the trail segment on the Mt. Shasta Mine Loop Trail (Figure 4) would require heavy equipment such as a CAT 320 excavator and a DH- 5 dozer. All work would be performed to Redwood National and State Parks standards (Spreiter 1992) that have been utilized successfully by the park in previous road restoration sites. The total distance of trail and road for removal and restoration would be about 2000 feet.



Figure 4. Location of old trail route to be removed and restored and new trail route

The new trail (Figure 4) would be constructed by hand and/or with heavy equipment such as a mini- excavator, 480 trail dozer or DH- 5 dozer. Out- sloping would be equal to or greater than the current trail grade, approximately ten percent if installed with equipment. The trail route would be removed of vegetation prior to all necessary survey work without ground disturbance to a width of about two feet.

Outsloping the remainder of Mt. Shasta Mine Loop Trail would utilize a CAT 320 excavator, mini- excavator, and DH- 5 dozer. All hydrologic crossings would have the fill removed and stored at site within the new road prism as critical dips. The trail width would be reduced to a size that would accommodate horses, bikes, and hikers, except where this trail is used as a shaded fuel break. In these locations the original width would be preserved (Figure 5). Native plants and grasses would be used to re- vegetate the flanks of the trail for stabilization and reduce trail width.

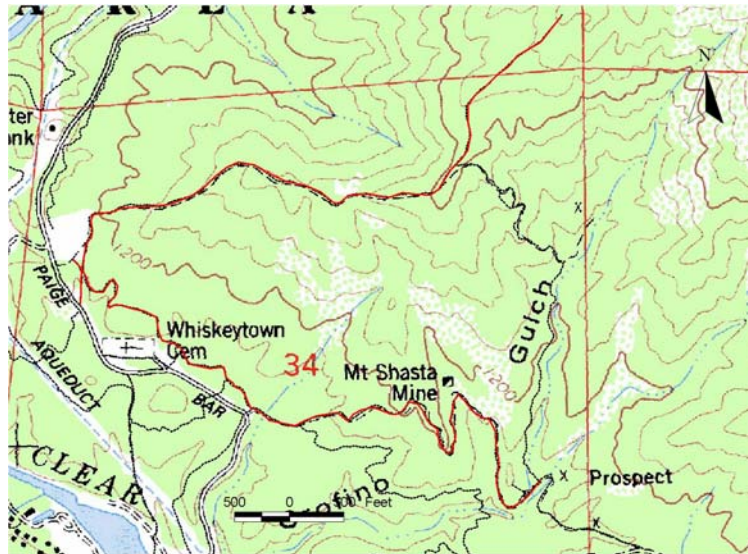


Figure 5. Location of out-sloping on the Mt. Shasta Mine Loop Trail

The remainder of Pope- Ericson Road and one small road fragment (Figure 6) would be removed using modified Redwood National and State Parks standards already implemented on other Whiskeytown restoration projects. A CAT 320 excavator and DH- 5 dozer would be used to remove the road. The disturbed areas would be mulched with downed material and vegetation from the road removal process. The restored area would be closed to allow natural re-vegetation. The approximate area of road removal and disturbance would be 0.6 miles (1 km) by 22 feet (7 meters) including several small spurs off the main road.



Figure 6. Location of the segment of Pope-Ericson Road to be removed

Trails Alternative

Under the Trails Alternative, restoration emphasis would be on addressing water crossings on the Clear Creek Canal Water Ditch Trail, construction of a BLM/NPS connector trail in the Salt Creek drainage and re- routing a trail segment on the Mt. Shasta Mine Loop. The road segment identified in the Roads Alternative that the new trail (re- route) replaces would not be removed. No work would commence until National Historic Preservation Act Section 106 compliance has been completed. The new re- routed trail on the Mt. Shasta Mine Loop Trail would be constructed as described in the Road Alternative section.

Stabilization and reconstruction of the Clear Creek Canal Water Ditch Trail would include heavy equipment and hand- work at hydrologic crossings (Figure 7). Only rubber tracked or rubber wheeled equipment would be used. Equipment used would include back- hoe, mini- excavator, motorized wheel barrow, and hand tools. Site access will prescribe equipment treatment. Crossings would be excavated (Appendix I), and failures would be reconstructed with fill from the crossings (Appendix II). Excess fill not used for reconstruction would be used to construct critical dips on both sides of the crossings to diminish flooding of the trail during high water events, and would be incorporated into the landscape in stable areas near the crossing. Some sections of the canal berm would be removed to allow water to drain off the canal. Four crossings have been identified for modification that may not require any work: 78+44, 80+92, 87+08, and 102+10. These four crossings would be monitored during rainstorms to determine if stabilization work would be required at these sites. One site, 31+85, may require installation of 24- inch culverts in order to facilitate crossing during the wet winter months. All efforts to avoid culvert installation would be considered including construction of a low water crossing.

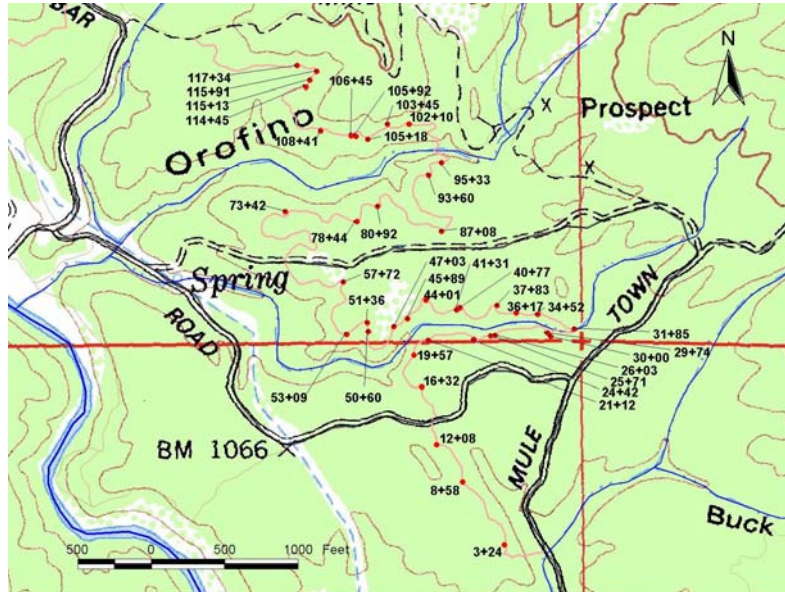


Figure 7. Location of treatments on the Clear Creek Canal Trail.

This alternative also includes the construction of a $\frac{1}{4}$ mile trail connecting the Salt Creek Trail to the BLM system of trails just outside of the park boundary. Figure 7a illustrates the general area of the trail. An approximate trail route has been flagged by park and BLM staff. The connector trail would depart from the Salt Creek Trail to follow an easy gradient until it reached the park boundary at a watershed divide. There is currently a shaded fuel break constructed on the divide—a feature that the new trail would need to cross. Natural barriers would be constructed to ensure that trail users do not confuse the shaded fuel break with the trail.

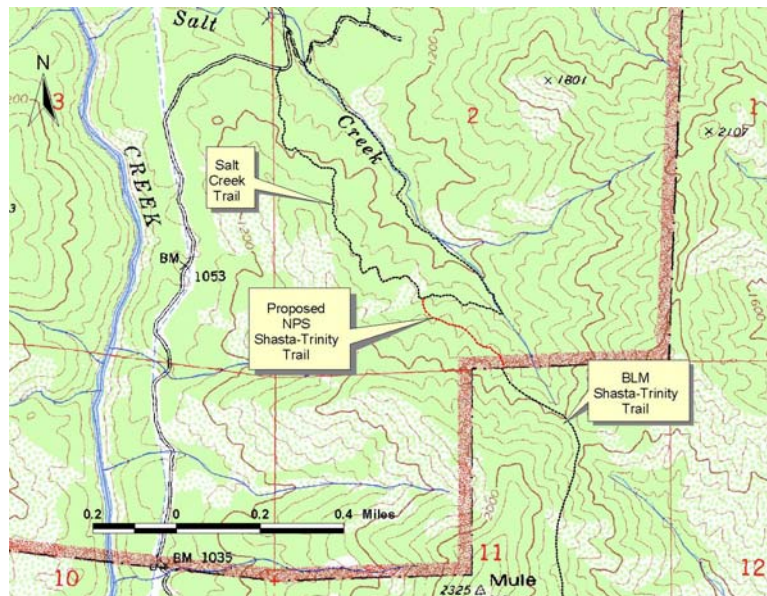


Figure 7A: Location of proposed NPS/BLM Connector Trail

Full Restoration Alternative (Agency Preferred Alternative/Environmentally Preferred Alternative)

Under the Full Restoration Alternative, all proposed project goals would be attempted. This includes new trail construction, road removal, and out-sloping of the Mt. Shasta Mine Loop

Trail. The remainder of Pope- Ericson Road would be removed and mercury sampling would occur on the tailings of the Mt. Shasta and Orofino mines. Work would proceed as outlined in the Roads Alternative and Trails Alternative. No work would commence until National Historic Preservation Act Section 106 compliance has been completed.

An additional element of this Alternative would be to sample tailings from the Mt. Shasta and Orofino mines for the presence of mercury. A small, mobile drilling rig would place several borings in the large tailings piles (possibly 50,000 cubic meters) and extract several depth-integrated soil samples for mercury analysis. These samples would be utilized for mercury remediation planning in the park. This plan of action is in accordance with discussion with NPS Geologic Resource Division personnel.

This is the environmentally preferred alternative because it allows the park to perform the greatest amount of sediment reduction and trail improvement. Currently the funding source for this project will not allow for the full treatment of this watershed, but as funding or resources become available, the Park will be able to further sediment reduction in the Orofino Creek watershed. This is very important when the tailings of the Mt. Shasta Mine are considered. The Full Restoration Alternative includes testing the tailings for mercury and allows resource managers to plan for the next step in watershed restoration.

Project Logistics

Under the preferred alternative, the Watershed Restoration and Trail Improvement project would be implemented in phases starting in the spring and ending in fall of 2003. For the heavy equipment portion of the project, the park would utilize its Cooperative Agreement with Shasta College to provide restoration training for the heavy equipment operators program. Other heavy equipment operators would either be supplied by the park, if available, or be contracted out. Shasta College would provide equipment operators for an excavator and a bulldozer and would perform road removal in areas that are determined to provide safe working conditions for beginning equipment operators.

Trail improvements and connector trail construction work would be performed by the California Conservation Corps based out of Redding. This group has worked with the BLM for construction up to the park boundary and is familiar with trail construction standards and conditions.

The proposed project is expected to require two weeks of archaeological survey and consultation. Since the project does not meet the requirements of an exclusion under the 1995 Servicewide Programmatic agreement among the National Park Service, the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers, standard consultation under Section 106 of the National Historic Preservation Act (36 CFR 800) must be completed. The project will also require; eight weeks of heavy equipment work with a bulldozer, excavator, water truck, and operators; and ten days of re- vegetation work. The NPS would provide funding, equipment rental and mobilization, a geologist and botanist, possibly heavy equipment operators, as well as equipment support (fuel etc.) and supplies.

Any obliterated or removed road segments would be accomplished using Redwood National and State Parks full obliteration standards (Spreiter, 1992) and would be expected to take 10 days. The road prism would be removed with an excavator and replaced back into the road cut using the excavator and dozer. Hydrologic crossings would be cleared of fill to allow proper drainage.

Re- vegetation work would proceed after road removal and trail work is completed to stabilize the disturbed soil and reduce potential erosion. Species used would natives to the area that were able to perform well on past projects, such as *Elymus glaucus*, (blue wild rye), *Bromus carinatus*

(California brome), and *Festuca idahoensis* (Idaho fescue). These grasses would be sown on all disturbed soil and covered with native grass mulch. Locally propagated native willows would be planted in wet areas as appropriate. Re-vegetation would require approximately 5 to 10 days of work with a California Conservation Corps, supervised by the park botanist.

Affected Environment

This section contains background information, a description of the proposed project area, and descriptions of the environment and natural and cultural resources found in the park and the Orofino Creek watershed.

Cultural Resources

A number of cultural resource projects have been conducted at Whiskeytown. These include archeological surveys and excavations, historic studies, and Native American consultations. A summary of cultural resources projects, recorded cultural resources and cultural resource management and planning documents is provided in the report "*Report On 1986- 87 Archeological Fieldwork Conducted by Park Service Staff in the Whiskeytown NRA, Whiskeytown- Shasta- Trinity National Recreation Area Shasta County, California*" (Eidness 1988). For projects completed since 1988 readers are referred to "*Archeological Excavations at CA- SHA- 479 and CA- SHA- 195, Shasta County, California*" (Baker 1990), "*Archeological Survey 1993 Whiskeytown NRA, Whiskeytown- Shasta- Trinity National Recreation Area California*," (Griffin and others 1994), "*Cultural Resources Inventory Shasta Divide Burn Unit Whiskeytown Unit Whiskeytown- Shasta- Trinity National Recreation Area*" (Griffin and others 1995), and "*Archeological Investigations at CA- SHA- 559, Whiskeytown- Shasta- Trinity National Recreation Area, California*" (Bevill, in progress). Additionally, a Cultural Landscape Inventory (Level I) has been completed for the park and has included the Lower Clear Creek area as an archaeological district.

To date, approximately 3,520 acres (about 8 percent) of the park have been archeologically surveyed and 84 archeological sites have been recorded. Consequently, little is known of the number and nature of cultural resources in the backcountry of Whiskeytown. This includes both historic and traditional cultural properties in addition to archeological sites.

Although only a limited portion of the park has been surveyed, a number of important historic and archeological resources have been identified in Whiskeytown National Recreation Area. The cultural resources found at Whiskeytown reflect a long history of human use of the area, extending over 7000 years. Prehistoric sites in the park provide evidence of early occupation by small mobile groups of hunter- gatherers. Later in time a more settled lifestyle developed with people occupying villages at lower elevations along the larger streams for part of the year, and dispersing in spring and summer to seek out seasonally available resources at higher elevations. This settlement/subsistence pattern continued, marked by increasing social complexity, into the 19th century when Euro- Americans entered the area (Baker 1990, Basgall and Hildebrandt 1989).

Whiskeytown is within the ethnographic territory of the Wintu (DuBois 1986) which includes the northern Sacramento River, tributaries to the east and west, and portions of the upper Trinity River drainage. The Wintu are relatively recent arrivals, and are believed to have entered the area about 1000 years ago. Wintu life centered around their villages, which were situated along rivers and larger streams such as Clear Creek. Deer and acorns were primary sources of food, and a wide variety of other plant and animal resources were also utilized. Two sub- groups, the Keswick and French Gulch Wintu, occupied or utilized resources within the present boundaries of Whiskeytown (DuBois 1986). The park has conducted limited consultations with local Wintu and it is clear that traditional ties to places like Whiskeytown remain. An ethnographic overview

of the park provides an up- to- date picture of the traditional uses within the park by the Wintu Tribe and Redding Rancheria groups.

Explorers and trappers began visiting the upper Sacramento Valley in the early part of the 19th century. Soon to follow were parties of settlers on their way to central California and Oregon. In 1848, gold was discovered on the Trinity River just west of Whiskeytown. "Boom towns", such as Shasta, Whiskeytown, and French Gulch grew quickly, as large numbers of miners arrived in the area. Placer mining for gold required dependable water supplies and immigrant Chinese laborers helped to build an elaborate system of ditches and flumes to meet this need. By the turn of the century, lode mining had replaced placer mining, leaving behind a profusion of tailings, pits, tunnels, and shafts. These remains of the mining history of the area are clearly evident at many places in Whiskeytown (Griffin and Smith 1995). Other examples of structures, features and orchards dating from the 1850's are located in the Tower House Historic District (Toogood and Henderson 1973).

Management concerns at Whiskeytown include identification, documentation, and assessment of affects, and the and protection of those resources that are eligible for or are listed on the National Register of Historic Places from impacts by developments, visitor use, and natural processes. The preservation of archeological and historic resources in the park is provided for in the National Historic Preservation Act of 1966 as amended, the Archeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990, and National Park Service policies.

Recent (May 2000, August 2002 and April 2003) archeological surveys by National Park Service archeologists have found cultural resources within the project area to include the National Register eligible Clear Creek Canal Water Ditch Trail, the Mt. Shasta Mine mining district, and other smaller, isolated remnants of prehistoric and historic sites.

Currently, stabilization plans for the Clear Creek Canal trail are under archeological review, and will be forwarded to California State Historic Preservation Office for approval with findings which state "No Adverse Affect." A survey of the Salt Creek drainage proposed area of a connector trail with BLM trails will be conducted prior to construction. Trail plans will be amended and submitted to the National Park Service Regional Office with a finding that states "No Adverse Affect" to cultural resources.

The Clear Creek Canal Water Ditch trail is built on a historic water ditch feature used to supply water for gold mining. Construction of the canal began in the early 1850's with much of the work preformed by Chinese labor. This canal is considered one of two major canals constructed for the purpose of gold mining, the other was called the Princess Ditch, which was built later as a competitor to the Clear Creek Canal ditch. Other smaller ditches exist within Whiskeytown, but were not built to the scale of the Clear Creek Canal. The Clear Creek Canal Water Ditch has been evaluated for National Register Eligibility and has been found eligible.

The Orofino Creek watershed also contains at least seven known abandoned gold mines. There are two tailing piles associated with the mining disturbances within the project site. The largest mining site, the Mt. Shasta Mine, processed gold on site with an eight- stamp mill that could crush 50 tons of ore per day.

Water Flow and Quality

The Orofino watershed is located in the lower Clear Creek watershed, south of Whiskeytown Dam. Stream channel gradients and slopes are steep, ranging from 10 to 80 percent. The watershed is drained by Orofino Creek and its sub drainages. Orofino Creek empties into Clear

Creek downstream from NEED Camp. Clear Creek continues south from Whiskeytown and then easterly to the Sacramento River about 12 miles downstream of the NEED Camp.

Historically, the cool clean water of Clear Creek and its stream system supported salmon and steelhead, and small numbers of these species are still found in Clear Creek today. The Central Valley Project Improvement Act (CVPIA) mandates that increased water flows and suitable stream temperatures are maintained in order to improve fisheries habitat in Clear Creek. Water quality must be within certain limits of temperature, turbidity, chemical purity, acidity, and oxygen content for salmon and steelhead to successfully reproduce in the stream system.

The Clear Creek Watershed Assessment (WSRCD 1996) reports that numerous samples taken on lower Clear Creek show accelerated runoff rates typical of a watershed that has lost a portion of its water- holding capacity. The presence of Whiskeytown Dam acts to reduce sediment input into the lower watershed from Clear Creek and keeps annual turbidity levels low except during major storm events. Streams below the dam that feed Clear Creek have a high sediment yield due to road building and mining activities. Sudden sediment releases during intense high-precipitation storms can have catastrophic affects on seasonally sensitive salmon and steelhead runs. The sediments from these lower watersheds provide sediment that suffocates the egg deposits. Watershed restoration work would decrease the amount of sediment delivered to lower Clear Creek during intense storms. Additionally, the Orofino Creek watershed has hosted major gold mining activities, which may indicate the presence of mercury within the tailings. Any mercury from these mine tailings could potentially be impairing water quality within the Orofino Creek and Clear Creek drainage.

Impairment of this resource includes any action, whether singular or cumulative, which result in a irreversible damage to the resource. More specific to water flow and quality, impairment constitutes any action which would result in irreversible damage to water quality or quantity. Actions taken by this project that could effect water quality or quantity include trail construction, road outsloping, road removal, and restoration of hydrologic crossings.

Soil and Geologic Resources

The Orofino Creek watershed is located within the Eastern Klamath Terrain of the Klamath Mountains geologic province. The project area is underlain by the Mule Mountain Stock, which is a coarse- grained holocrystalline rock first described as a quartz- hornblende diorite (Diller 1906). This type of rock is highly erodible due to the unstable calcium- rich composition. Interestingly, this type of rock is named for Mule Mountain (Hinds 1933), less then two miles away from the project site.

Soils in the area are well drained to very- well drained loams and loamy sands. They are underlain by weathered granite at a depth of 20- 40 inches. Weathered granites are structurally weak and easily broken down. Weathering has not progressed to the point of clay formation. The results are coarse textured, easily eroded soils and a predominance of weak bedrock that is easily broken down into sands with very little silt or clay. The very low clay content, coarse texture, and steep slopes combine to create a high erosion hazard.

Impairment of this resource includes any action(s), whether singular or cumulative, which result in an irreversible damage to the resource. More specific to soil and geologic resources, impairment constitutes any action(s) which would result in irreversible damage to soil and geologic resources. Actions taken by this project that could effect soil and geologic resources include trail construction, road outsloping, road removal, and restoration of hydrologic crossings.

Air Quality

Whiskeytown National Recreation Area is classified as a Class II airshed under the Federal Clean Air Act (42 USC 7401 et seq. as amended). The Federal Clean Air Act stipulates that federal land managers have an affirmative responsibility to protect a park's air quality-related values, including visibility, plants, animals, soils, water quality, cultural and historic structures and objects, and visitor health from adverse air pollution impacts. The Shasta County Air Pollution Control District regulates air quality issues within Whiskeytown.

Maintaining acceptable air quality in the park and its boundary communities is mandated by law and is important considering the tourist-based economy of the region. An area where a standard is exceeded more than three times in three years can be considered a non-attainment area subject to planning and pollution control requirements that are more stringent than areas that meet standards.

Impairment of this resource includes any action(s), whether singular or cumulative, which result in an irreversible damage to the resource. More specific to air quality, impairment constitutes any action(s) which would result in irreversible damage air quality. Actions taken by this project that could effect air quality include exhaust from use of heavy equipment for road outslowing, road removal, and restoration of hydrologic crossings.

Anadromous Fish and Other Wildlife

Whiskeytown supports an abundant and diverse wildlife community, which reflects the diversity of the vegetative communities in the park. More than 200 vertebrate species are known to occur in the park, including at least 35 mammal species, 150 bird species, and 25 reptile and amphibian species. Additional species are likely to be confirmed in the park as wildlife inventories become more complete. The perpetuation of relatively intact wildlife populations within the park is partially dependent on the ability of public and a private land manager to ensure that adequate habitat is protected in and around the park boundary. The population of Redding has grown from 16,000 to 80,000 in the last 20 years, and some encroachment on wildlife habitat near the park has occurred. Habitat fragmentation resulting from current and past land management actions within and outside of the park boundary continues to be a major threat to wildlife. Catastrophic wildfire from unnatural fuel buildup and the introduction of exotic species are other major threats.

Whiskeytown Lake and its tributaries support a large variety of fish, both native and exotic. Fish present at Whiskeytown include rainbow trout (*Salmo gairdnerii*), largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), spotted bass (*Micropterus punctulatus*), Kokanee salmon (*Oncorhynchus nerka kennerlyi*), chinook salmon (*Onchorhynchus tshawytscha*), bluegill (*Lepomis macrochirus*), black crappie (*Poxomis nigromaculatus*), brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), channel catfish (*Ictalurus punctatus*), brown bullheads (*Ictalurus nebulosus*), Sacramento squawfish (*Ptychocheilus grandis*), hardhead (*Mylopharodon conocephalus*), green sunfish (*Lepomis cyanellus*), western suckers (*Catostomus occidentalis*), and riffle sculpins (*Cottus gulosus*). The California Department of Fish and Game regularly stocks rainbow trout and brook trout in Whiskeytown Lake and some of the perennial streams during the spring and summer months. The lake has also been historically stocked with brown trout and kokanee salmon.

Impairment of this resource includes any action(s), whether singular or cumulative, which result in an irreversible damage to the resource. More specific to anadromous fish and other wildlife, impairment constitutes any action(s) which would result in irreversible damage to anadromous fish and other wildlife. Actions taken by this project that could anadromous fish and other

wildlife include trail construction, road outcropping, road removal, and restoration of hydrologic crossings.

Special Status Wildlife Species (Endangered, Threatened, Candidate, Rare and Special Concern Species)

Two federally threatened wildlife species are known to occur in the park, the bald eagle (*Haliaeetus leucocephalus*) and the northern spotted owl (*Strix occidentalis caurina*).

Bald eagles were first documented as nesting at Whiskeytown Lake in 1973. There is currently two nesting pair of bald eagles at Whiskeytown as well as a substantial wintering population. The goals of bald eagle management at Whiskeytown are to protect nesting bald eagles from disturbance and to maintain and enhance bald eagle habitat. The following actions are taken to accomplish these goals:

- Eliminate disturbances to bald eagle nest sites between January 1 and July 31 of each year by restricting access to nesting territories via area closures.
- Consult with the U.S. Fish and Wildlife Service (USFWS), under section 7 of The Endangered Species Act, prior to development or habitat manipulation within a bald eagle nesting area.
- Conduct low intensity prescribed fires that preserve dominant trees and reduce fuel loads to decrease the probability of catastrophic wildfire.
- Periodically monitor bald eagle prey base, especially fish and waterfowl populations, to document changes that could affect eagle productivity.
- Develop silvicultural prescriptions, in conjunction with USFWS, to manage for present and future suitable bald eagle nesting habitat.

Whiskeytown's two nesting pairs of bald eagles were monitored for nesting success sporadically from 1979 to 1986. Bald eagles have been closely monitored for nesting success and productivity since 1986. Areas of the park that contain potential bald eagle nesting habitat are surveyed annually for potential new nesting territories. California Department of Fish and Game Bald Eagle Nesting Territory Report Forms are completed at the end of each nesting season. Additionally, the Park participates in the annual USFWS mid- winter bald eagle survey.

A single pair of nesting northern spotted owls with two fledglings was discovered in the summer of 1994. The activity center has been monitored annually since this time and records are kept detailing nesting location, status, and production. This activity center has successfully produced young during three of the last seven years. Spotted owl surveys are ongoing and eventually all suitable habitat within the Unit would be surveyed. The detection of additional pairs of northern spotted owls is possible as some suitable habitat exists in some of the more remote areas of the park. The USFWS is consulted, under section 7 of The Endangered Species Act, prior to development or habitat manipulation in areas meeting the criteria for suitable spotted owl habitat.

The range of the valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), a federally Threatened species, overlaps the park and some suitable habitat may exist in the lower elevation riparian areas, but no sightings have occurred to date.

The peregrine falcon (*Falco peregrinus*), a recently federally de-listed species and state Endangered Species, has been reported a few times by members of the local chapter of the Audubon Society and is likely a migrant, although some potential nesting habitat may exist on the southeast side of Shasta Bally.

Two federally threatened fish species occur in Clear Creek below Whiskeytown Dam. These are the spring-run chinook salmon (*Oncorhynchus tshawytscha*) and Central Valley ESU steelhead trout (*Onchorynchus mykiss*). The removal of McCormick-Saeltzer Dam on lower Clear Creek in the fall of 2000 has allowed these two species access to Whiskeytown NRA. These anadromous fish are now utilizing portions of lower Clear Creek within Whiskeytown NRA for spawning. Spawning gravels are being added to Clear Creek below Whiskeytown Dam to enhance this habitat.

The park also contains four federal Species of Concern. Those species are: foothill yellow-legged frog (*Rana boylei*), northwestern pond turtle (*Clemmys marmorata marmorata*), pacific fisher (*Martes pennanti pacifica*), and the pacific western big-eared bat (*Corynorhinus townsendii townsendii*). The Whiskeytown Unit contains several species with California state status but no federal status. The bank swallow (*Riparia riparia*), a California threatened species, has been observed several times within the park by members of the local Audubon Society and is probably a rare summer resident. The following species are confirmed to occur at Whiskeytown and are California Species of Special Concern: Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*), osprey (*Pandion haliaetus*), yellow-breasted chat (*Icteria virens*), yellow warbler (*Dendroica petechia*), common loon (*Gavia immer*), California gull (*Larus californicus*), double-crested cormorant (*Phalacrocorax auritus*), pallid bat (*Atrozous pallidus*), and merlin (*Falco columbarius*). Additional species with federal or state status may be discovered within the park as wildlife inventories become more complete.

Of the Threatened and Endangered species and Species of Concern listed above the project area contains habitat for foothill yellow-legged frog and western pond turtle and would have an affect on habitat for anadromous fish in lower Clear Creek.

Impairment of this resource includes any action(s), whether singular or cumulative, which result in an irreversible damage to the resource. More specific to special status wildlife species, impairment constitutes any action(s) which would result in irreversible damage to special status wildlife species. Actions taken by this project that could effect special status wildlife species include trail construction, road outslowing, road removal, and restoration of hydrologic crossings.

Vegetation

Knobcone pine communities cover approximately 2000 acres in the lower elevations in the park, from 1000 to 2000 foot elevations. More specific, the areas of proposed action for the Orofino Creek project are all in Knobcone pine communities. The even-aged knobcone pines in this plant community have a sparse overstory that is sometimes co-dominated by black oak, with scattered grey pine (*Pinus sabiniana*), ponderosa pine, and other occasional hardwood and softwood species. The understory is dominated by whiteleaf manzanita (*Arctostaphylos viscida*), with toyon, poison oak, California buckeye (*Aesculus californica*), coffeeberry (*Rhamnus spp.*), yerba santa, and ceanothus species mixed throughout. The groundcover is a diverse blend of perennial and annual grasses, with herbaceous species such as buckwheat (*Eriogonum spp.*), bracken fern, (*Pteridium aquilinum var. pubescens*) and everlasting (*Antennaria spp.* and *Gnaphalium spp.*) in areas that are more open.

Impairment of this resource includes any action(s), whether singular or cumulative, which result in a irreversible damage to the resource. More specific to vegetation, including sensitive plant species and exotic plant species, impairment constitutes any action(s) which would result in irreversible damage to vegetation. Actions taken by this project that could effect vegetation include trail construction, road outslowing, road removal, and restoration of hydrologic crossings.

Sensitive Plant Species

Plant species of special concern (threatened, endangered, candidate, or sensitive species) found in the park include: Howell's alkali grass (*Puccinellia howellii*), Shasta County arnica (*Arnica venosa*), clustered lady's slipper (*Cypripedium fasciculatum*), western trillium (*Trillium ovatum*), Sanborn's onion (*Allium sanbornii* ssp. *sanbornii*), snow Mountain beard tongue (*Penstemon purpusii*), Tehama navarretia (*Navarretia heterandra*), yellow triteleia (*Triteleia crocea* Greene var *crocea*), Sanford's arrowhead (*Sagittaria sanfordii*), small spikerush (*Eleocharis parvula*), three-bracted onion (*Allium tribracteatum*), Mildred's clarkia (*Clarkia mildrediae*), Sierra clarkia (*Clarkia virgata*), Rattan's linanthus (*Linanthus rattanii*), red-anthered juncus (*Juncus marginatus*), and canyon stonecrop (*Sedum paradisum*).

None of these species of special concern are known to occur in the Orofino watershed/Pope-Ericson project area. Suitable habitat exists for *Allium sanbornii* spp. *sanbornii*. This plant is listed on a watch list (list 4) of the California Native Plant Society Inventory of Rare, and Endangered Vascular Plants of California, Fifth Edition. Workers would be instructed to look for these plants. Work would be stopped and mitigation measures would be implemented to protect these or other plants of special concern discovered during project work.

Exotic Plant Species

Within Whiskeytown, there are 195 known exotic plants, of which seventeen are considered invasive and subject to eradication. The known invasive species are: tree of heaven (*Ailanthus altissima*), giant reed (*Arundo donax*), tumbling oracle (*Atriplex rosea*), ripgut brome (*Bromus diandrus*), yellow star thistle (*Centaurea solstitialis*), bull thistle (*Cirsium vulgare*), field bindweed (*Convolvulus arvensis*), scotch broom (*Cytisus scoparius*), french broom (*Genista monspessulava*), english ivy, (*Hedera helix*), himalaya berry (*Rubus discolor*), spanish broom (*Spartium junceum*), medusa head (*Taeniatherum caput-medusa*), salt cedar (*Tamarix chinensis*), moth mullein (*Verbascum blattaria*), common mullein (*Verbascum thapsus*), and vinca (*Vinca major*). Several exotic plant species are known to exist in the Orofino Creek area, including star thistle, bull thistle, french broom, himalaya berry, and common mullein.

Recreation and Visual Resources

The Mt. Shasta Mine Loop Trail and Clear Creek Canal trail are popular recreation sites currently used by pedestrians, horseback riders, and mountain bike riders. The current condition of Pope-Ericson Road, the Mt. Shasta Mine Loop, and Clear Creek Canal trail are not in compliance with NPS objectives to restore natural conditions on lands altered by human activity. Increased interest and use by members of the public of Whiskeytown's trails has prompted park staff to begin planning for long range improvements. Some equestrians and bikers use unmaintained or undesignated social trails in popular areas of the park, such as in the project area. It is anticipated that the completion and improvement of the BLM trails network would increase the expectations by members of the public to open an 'official' connector trail into Whiskeytown.

Visual resources for this area include views of low elevation Mediterranean forest habitats at various stages of development as well as view points of mountain peaks and valleys. For the most part, the limited visual resources in this area are a result of the fact that the trails used are adapted from roads that were not constructed for views or vista sites.

Impairment of this resource includes any action(s), whether singular or cumulative, which result in an irreversible damage to the resource. More specific recreation, impairment constitutes any action(s) which would result in irreversible damage to recreation. Actions taken by this project that could effect recreation include, road outcropping, road removal, and restoration of hydrologic crossings.

Impacts

Each alternative is evaluated in terms of how the actions proposed will impact the affected environment described above. The reader is then able to evaluate the relative advantages and disadvantages relative to each alternative. A description of the methods for determining impacts to an affected environment is listed below, followed by an assessment of the environmental impacts for each alternative. Impacts are measured in terms of type, duration, and intensity. Topics for impact analysis were developed internally at the park and from a public scoping meeting and all topics raised were analyzed. The degree of impact for each topic was developed through professional expertise at the park and from experience on other similar projects.

Type of Impact

Adverse: *Likely to result in unnatural or detrimental changes to the resource.*

Beneficial: *Likely to protect and /or restore the resource.*

Duration of Impact

Short- term: *Immediate changes to the resource where the effects last one year (season).*

Intermediate- term: *Immediate changes to the resource where the effects last two to four years.*

Long- term: *Immediate changes to the resource where the effects last more than four years.*

Intensity of Impact

Negligible: *Imperceptible or undetectable impacts.*

Minor: *Slightly perceptible, and limited in extent. Without further impacts, adverse impacts would reverse and the resources would recover.*

Moderate: *Readily apparent, but limited in extent. Without further impacts, adverse impacts would eventually reverse and the resource would recover.*

Major: *Substantial, highly noticeable, and affecting a large area. Changes would not reverse without active management.*

Intensity of Impact for Historic, Cultural, and Ethnographic Resources

Negligible: *No historic properties present.*

Minor: *Project activities will have no adverse effect on historic properties present.*

Moderate: *Adverse effects to historic properties can be negated or minimized.*

Major: *Adverse effect to historic property; mitigation must be documented in an official Memorandum of with SHPO.*

Impairment

The National Park Service Mission Statement provides congressional direction stating that no park may take an action or make a decision that would impair park resources or values. No impairment of park resources or values would occur under any of the action alternatives described in this environmental assessment.

No Action Alternative

Under this alternative, there would be no proactive management or restoration of the Pope-Ericson Road, the Mt. Shasta Mine Loop Trail, or Clear Creek Canal trail. Current trails would be maintained and no new trail construction would take place. Under this alternative, the temporary increase of erosion and sedimentation due to project work would not occur. Pope-Ericson Road, the Mt. Shasta Mine Loop Trail, and the Clear Creek Canal trail would continue to be maintained according to current roads and trails maintenance practices. Current erosion and

sedimentation would continue. No planned reduction of sediment delivered to streams would occur under this alternative. Additionally, the tailings associated with the Mt. Shasta and Orofino mines would not be assessed for the presence of Mercury.

Cultural Resources

Under the No Action Alternative, there would be an adverse, long- term, major impact to the Clear Creek Canal trail. The trail would continue to fill with sediment and erode due to improper hydrologic crossings. Additionally, areas of ditch feature failure would remain in an unacceptable condition. Cultural resources identified in the Salt Creek drainage may be adversely impacted from undesignated, unmaintained trails constructed by park visitors. There would be no impairment of park resources or values related to cultural resources under this alternative.

Water Flow and Quality

Under the No Action Alternative, adverse, long- term, major impacts to Orofino and lower Clear Creek would occur. Continued erosion from poorly designed and maintained roads and trails would supply fine sediment to Orofino Creek and lower Clear Creek, fowling spawning bed habitat and reducing visibility for anadromous fish, including several Threatened and Endangered species.

Under the No Action Alternative, adverse, long- term, moderate impacts from hydrologic diversion would continue. Poorly constructed and maintained trails and roads divert water from one sub- watershed into other sub- watersheds depriving or concentrating water in sub- watersheds. Water quality may be impaired under if no action is taken to improve the Orofino Creek Watershed.

Soil and Geologic Resources

Under the No Action Alternative, adverse, long- term, major impacts to soil would continue. Accelerated erosion and soil loss from poorly constructed or maintained trails would continue.

Air Quality

Under the No Action Alternative, beneficial, long- term, negligible impacts would occur. No exhaust or diesel fumes (fueling) from heavy equipment work would enter the atmosphere.

Anadromous Fish and Other Wildlife

Under the No Action Alternative, adverse, long- term, major impacts would occur to anadromous and aquatic species from sedimentation of Orofino and lower Clear Creek. Continued increased erosion would supply fine sediment to Orofino Creek and lower Clear Creek, fowling spawning bed habitat and reducing visibility for anadromous fish, including several Threatened and Endangered species. Sedimentation would also affect other aquatic species from loss of habitat and poor visibility. This has the potential to result in an impairment of park resources and values related to anadromous fish and wildlife.

Under the No Action Alternative, beneficial, short- term, minor impacts would occur to wildlife by avoiding noise from humans and heavy equipment during project activity.

Vegetation

Under the No Action Alternative, there would be no impact and no impairment related to non-sensitive vegetation.

Sensitive Species and Exotic Plants

Under the No Action Alternative, there would be no impact and no impairment related to sensitive species and exotic plants.

Recreation

Under the No Action Alternative, there would continue to be adverse, long- term, major impact to recreation on trails and roads within Orofino Creek watershed. Poorly designed and maintained trails would continue to degrade from erosion, providing for a less enjoyable recreation experience. A steep section of the Mount Shasta Mine Loop Trail would not be re-routed. There would be no official connector trail between BLM and Whiskeytown trails—possibly resulting in numerous unofficial, unmaintained trails—a long- term adverse impact to recreation. Visual resources would not be improved upon. There would be no impairment to park resources or values related to recreation under this alternative.

Cumulative Impacts

Under the No Action Alternative, cumulative impacts would occur to the resources of Water Flow and Quality, Soil and Geologic Resources, Anadromous Fish and other Wildlife, and Recreation.

Taking no action would have adverse, long- term, major impacts to water flow and quality from erosion of the roads and trails listed in this project and other roads trails in the area. This would continue to contribute elevated sediment loads to Orofino Creek and ultimately lower Clear Creek; compromising water quality in both streams.

Taking no action would have adverse, long- term, major impacts to soil from erosion of the roads and trails listed in this project and other roads and trails in the area. Erosion would continue, removing soils from roads and trails.

Taking no action would have an adverse, long- term, major impact to anadromous fish. Continued sedimentation to lower Clear Creek will foul spawning gravels essential to reproduction of anadromous fish.

Taking no action would have an adverse, long- term, moderate impact to recreation. Poor trail conditions for features listed in this project combined with other trails in the area provide for lesser degree of visitor satisfaction.

Roads Alternative

Under the Roads Alternative, the Pope- Ericson Road would be completely removed and re-vegetated, portions of the Mt. Shasta Mine Loop trail would be outsloped and reduced in width to a size that would accommodate horses, bikes, and hikers. A new segment of trail would be added to the Mt. Shasta Mine Loop Trail replacing a portion of the current trail that would be removed and restored. The remainder of Pope- Ericson Road and one small road fragment would be removed using modified Redwood National Park standards already implemented on other Whiskeytown restoration projects. No new connector trail would be constructed to the BLM trails network.

Cultural Resources

Under the Roads Alternative, adverse to beneficial, short- term to long- term, minor to moderate impacts may occur on the Mt. Shasta Loop trail and Pope- Ericson Road. In the event that cultural artifacts are encountered during project implementation, work in that location would be temporarily suspended until an archeologist meeting the Secretary of Interior Standards has evaluated the find. Although all areas of proposed work area have had archeological survey prior to work, there is a minor chance of new discoveries and for burial of undiscovered artifacts. Cultural resources identified in the Salt Creek drainage may have adverse, moderate, long- term impacts from undesignated, unmaintained trails constructed by park visitors. There would be no impairment to park resources or values related to cultural resources under this alternative.

Water Flow and Quality

Under the Roads Alternative, there would be adverse, short- term, minor impact to the Mt. Shasta Loop trail and Pope- Ericson Road from increased sedimentation. Ground disturbance in these areas would cause temporary increase of fine sediment delivery to Orofino Creek and lower Clear Creek.

Under the Roads Alternative, there would be beneficial, long- term, major impacts to the Mt. Shasta Loop trail and Pope- Ericson Road from decreased sediment delivery to Orofino Creek and lower Clear Creek.

Under the Roads Alternative, there would be a beneficial, long- term, negligible to minor impact from hydrologic correction of water flow. Mitigation of poorly constructed and maintained road crossings would minimize water diversion from sub- watersheds into other sub- watersheds.

Under the Roads Alternative, there would be adverse short- term to long- term, minor impacts from construction of a new trail segment. Trails would divert water flow into other sub- watersheds. Mitigation would include out- sloping and a maximum grade of ten percent. There would be no impairment to park resources or values related to water flow and quality under this alternative.

Soil and Geologic Resources

Under the Roads Alternative, there would be beneficial, long- term, major impacts to soil from reduced mobilization from road surfaces. Out- sloping of roads and trails would reduce runoff concentration and allow a more natural overland flow to occur. Removing fill from hydrologic crossings would stabilize and minimize mobilization of sediments (soil) within these crossings. Road removal would also minimize mobilization of sediments (soil) from the former road surface.

Under the Roads Alternative, there would be adverse short- term to long- term, minor impacts from construction of a new trail segment. Increased erosion can occur from installation of a trail. To mitigate these impacts, the trail would be a minimum in width (enough to allow horses) and the trail would be at ten percent grade and out- sloped. There would be no impairment to park resources or values related to soil and geologic resources under this alternative.

Air Quality

Under the Roads Alternative, there would be an adverse, short- term, negligible impact from exhaust or diesel fumes (fueling) from heavy equipment during project construction. There would be no impairment of park resources or values related to air quality under this alternative.

Anadromous Fish and Other Wildlife

Under the Roads Alternative, beneficial, long- term, major impacts would occur to anadromous and aquatic species from reduction of sedimentation in Orofino and lower Clear Creek. Mitigation of sediment delivery to Orofino Creek and lower Clear Creek would decrease erosion that supplies fine sediment to Orofino Creek and lower Clear Creek, fowling spawning bed habitat and reducing visibility for anadromous fish. Reduced sedimentation would also enhance other aquatic species habitat by reducing loss of habitat and improving visibility.

Under the Roads Alternative, there would be an adverse, short- term, minor impact from increased sedimentation. Ground disturbance in these areas would cause temporary increase of fine sediment delivery to Orofino Creek and lower Clear Creek. There would be no impairment to park resources or values related to anadromous fish and other wildlife under this alternative.

Vegetation

Under the Roads Alternative, there would be an adverse, long- term, negligible impact to non-sensitive vegetation. Road removal and outsloping will remove vegetation from the sides of the roads in order to retrieve berm material for construction of these surfaces. Trail construction will remove vegetation along the entire route of the new trail. Efforts will be taken not to remove large ponderosa and oak.

Sensitive Species and Exotic Plants

Under the Roads Alternative, there would be a beneficial, short- term, moderate impact to sensitive species in Clear Creek from a reduction of sediment delivery from roads and trails within Orofino Creek watershed.

Under the Roads Alternative, there would be an adverse, short- term, moderate impact to the Mt. Shasta Loop trail and Pope- Ericson Road from increased sedimentation. Ground disturbance in these areas would cause temporary increase of fine sediment delivery to Orofino Creek and lower Clear Creek.

Under the Roads Alternative, there is potential for an adverse, short- term to long- term, minor to moderate impact for spread of exotic species where ground disturbance occurs. Without proper mitigation (cleaning), heavy equipment can import exotic seed to work areas within Whiskeytown. Additionally, exotics can be introduced to disturbed ground as seeds blow in from other sources. There would be no impairment related to park resources or values related to sensitive species or exotic plants under this alternative.

Recreation

Under the Roads Alternative, there would be an adverse, short- term, major impact to recreation on the Mt. Shasta Mine Loop Trail. These trails would be closed during restoration. There would be no official connector trail between BLM and Whiskeytown trails- possibly resulting in numerous unofficial, unmaintained trails—a long- term adverse impact to recreation.

Under the Roads Alternative, there would be an adverse, long- term, major impact to recreation on Pope- Ericson Road. Road removal would restrict access to this area. Visual resources would be improved in areas where views of mountain peaks and valleys could practicably be maintained. There would be no impairment to park resources or values related to recreation under this alternative.

Cumulative Impacts

Under the Roads Alternative, there would be cumulative impacts to the resources of Water Flow and Quality, Soil and Geologic Resources, Anadromous Fish and other Wildlife, and Vegetation.

Water Flow and Quality would have an adverse, short- term to long term, moderate impact from ground disturbance in the project areas combined with other erosional features out of the project area. This impact does not include the removed section of Pope- Ericson Road that has had time to stabilize, but does include work by the BLM on the Shasta- Trinity Trail. This would cause temporary increase of fine sediment delivery to Orofino Creek and lower Clear Creek. Water Flow and Quality would have a beneficial, long- term, moderate impact from a decrease in the overall sediment devlry to lower Clear Creek. This impact does include previous work performed on Pope- Ericson Road and current work by the BLM on the Shasta- Trinity Trail.

Soil and Geologic Resources would have an adverse, short- term to long term, moderate impact from ground disturbance in the project area combined with other erosional features out of the project area. Fine- grained sediments will mobilize when soil is disturbed. This impact does not include the removed section of Pope- Ericson Road that has had time to stabilize, but does include work by the BLM on the Shasta- Trinity Trail. Soil and Geologic Resources would have a

beneficial, long- term, moderate impact by reducing sediment delivery to lower Clear Creek. This impact does include previous work performed on Pope- Ericson Road and current work by the BLM on the Shasta- Trinity Trail.

Anadromous Fish and other Wildlife would have an adverse, short- term, moderate impact from sediment delivery to lower Clear Creek fisheries. Fine- grained sediment fowls spawning gravels used for anadromous fish reproduction. This impact does not include the removed section of Pope- Ericson Road that has had time to stabilize, but does include work by the BLM on the Shasta- Trinity Trail. Anadromous Fish and other Wildlife would have a beneficial, long- term, major impact. Reduction in sediment transport to lower Clear Creek will allow for more healthy spawning gravels, allowing greater reproduction of anadromous fish.

Vegetation will have a cumulative adverse, long- term, minor impact from increased vegetation removal during trail construction, road removal, and road and trail outsloping. Although other projects in the area such fuel break construction is occurring in the area, the vegetation removed (manzanita) is prolific and will recover well over time.

Trails Alternative

Under this alternative, the Shasta Mile Loop trail would have a new trail segment added as well as stabilization and partial reconstruction of degraded/eroded portions of the Clear Creek Canal Trail. This would include fill removal at hydrologic crossings and reconstruction of ditch in heavily eroded areas. Additionally, a connector trail of about ¼ mile between the BLM and Whiskeytown trails networks would be constructed off the Salt Creek trail.

Cultural Resources

Under the Trails Alternative, there would be beneficial, long- term, major impact to the Clear Creek Canal trail. In the event that cultural artifacts are encountered during project implementation, work in that location would be temporarily suspended until an archeologist meeting the Secretary of Interior Standards has evaluated the find. Stabilization through restoration of some hydrologic crossings would reduce the amount of water diversion on the trail surface, reducing erosion and filling of the trail. Undetected cultural resources in Salt Creek drainage would also be protected by careful construction of a connector trail to the BLM trails system.

There would be some negligible adverse impact through loss of cultural integrity to some berm areas of Clear Creek Canal where water would be directed out of the ditch, however, long- term beneficial major impact on the trail itself. In areas where reconstruction of the ditch (water crossings), no cultural integrity would be compromised. These areas would be accurately mapped and included on site records to indicate where reconstruction takes place. There would be no impairment to park resources or values related to cultural resources under this alternative.

Water Flow and Quality

Under the Trails Alternative, impact would be the same as the Roads Alternative. There would be no impairment to park resources or values related to water flow or quality under this alternative.

Soil and Geologic Resources

Under the Trails Alternative, impact would be the same as the Roads Alternative. There would be impairment to park resources or values related to soil and geologic resources under this alternative.

Air Quality

Under the Trails Alternative, impact would be the same as the Roads Alternative. There would be no impairment to park resources or values related to air quality under this alternative.

Anadromous Fish and Other Wildlife

Under the Trails Alternative, impact would be the same as the Roads Alternative. There would be impairment to park resources or values related to anadromous fish or other wildlife under this alternative.

Vegetation

Under the Trails Alternative, there would be an adverse, long-term, negligible impact to vegetation. Trail out-sloping will remove vegetation from the sides of the trails in order to retrieve berm material for construction of these surfaces. Trail construction will remove vegetation along the entire route of the new trail. Efforts will be taken not to remove large ponderosa and oak.

Sensitive Species and Exotic Plants

Under the Trails Alternative, impact would be the same as the Roads Alternative. There would be no impairment to park resources or values related to sensitive species or exotic plants under this alternative.

Recreation

Recreational impacts under this alternative would be the same as under the Roads Alternative with the exception of a beneficial long-term impact from a connection between the BLM and Whiskeytown trails systems. Visual resources would be improved upon in areas where views of mountain peaks and valleys could practicably be maintained. There would be no impairment to park resources or values related to recreation under this alternative.

Cumulative Impacts

The cumulative impacts for the Trails Alternative are identical to the Roads Alternative.

Full Restoration Alternative

This alternative includes new trail construction, road removal, and out-sloping of the Mt. Shasta Mine Loop Trail. The remainder of Pope-Ericson Road would be removed and mercury sampling would occur on the tailings of the Mt. Shasta and Orofino mines. Work would proceed as outlined in both the Roads Alternative and Trails Alternative.

Cultural Resources

Under this alternative, adverse to beneficial, short-term to long-term, minor to moderate impacts may occur on Mt. Shasta Loop trail and Pope-Ericson Road. In the event that cultural artifacts are encountered during project implementation, work in that location would be temporarily suspended until an archeologist meeting the Secretary of Interior Standards has evaluated the find. There would be beneficial, long-term, major impacts to the Clear Creek Canal trail. Stabilization through restoration of some hydrologic crossings would reduce the amount of water diversion on the trail surface, reducing erosion and filling of the trail. Although all areas of proposed work area have had archeological survey prior to work, there is a chance of new discoveries and for burial of undiscovered artifacts.

There would be some negligible adverse impact through loss of cultural integrity to some berm areas of Clear Creek Canal where water would be directed out of the ditch, however, long-term beneficial major impact on the trail itself. In areas where reconstruction of the ditch (water crossings), no cultural integrity would be compromised. These areas would be accurately mapped and included on site records to indicate where reconstruction takes place. There would be no impairment to park resources or values related to cultural resources under this alternative.

Water Flow and Quality

Under the Trails Alternative, impact would be the same as the Roads Alternative and the Trails Alternative. There would be no impairment to park resources or values related to water flow and quality under this alternative.

Soil and Geologic Resources

Under the Trails Alternative, impact would be the same as the Roads Alternative and the Trails Alternative. There would be no impairment to park resources or values related to soil and geologic resources under this alternative.

Air Quality

Under the Trails Alternative, impact would be the same as the Roads Alternative and the Trails Alternative. There would be no impairment to park resources or values related to air quality under this alternative.

Anadromous Fish and Other Wildlife

Under the Trails Alternative, impact would be the same as the Roads Alternative and the Trails Alternative. There would be no impairment to park resources or values related to anadromous fish and other wildlife under this alternative.

Vegetation

Under the Full Restoration Alternative, impact would be the same as the Roads Alternative and the Trails Alternative. There would be no impairment to park resources or values related to air quality under this alternative.

Sensitive Species and Exotic Plants

Under the Trails Alternative, impact would be the same as the Roads Alternative and the Trails Alternative. There would be no impairment to park resources or values related to sensitive species and exotic plants under this alternative.

Recreation

Under the Trails Alternative, impacts would be the same as the Roads Alternative, with two exceptions. Construction of a connector trail between BLM and Whiskeytown trails systems would be a beneficial long- term impact from a connection between the BLM and Whiskeytown trails systems. This alternative would also include sampling of the Mt. Shasta Mine and Orofino Mine tailings for mercury. Mercury contamination in this area may adversely impact recreational use in the long- term, however, at this time, park staff are not able to evaluate the impacts to recreational use without first having mercury contamination data. Visual resources would be improved upon in areas where views of mountain peaks and valleys could practicably be maintained. There would be no impairment to park resources or values related to recreation under this alternative.

Cumulative Impacts

The cumulative impacts for the Full Restoration Alternative are identical to the Roads Alternative and the Trails Alternative.

Table 3: Review of Alternatives by Affected Environments

Affected Environment	ALTERNATIVES			
	No Action	Trails	Roads	Full Restoration
Cultural Resources	Continued Erosion and loss feature integrity (Clr Crk Canal)	Stabilization of feature and restoration of hydrologic crossings (Clr Crk Canal)	Continued Erosion and loss feature integrity (Clr Crk Canal)	Stabilization of feature and restoration of hydrologic crossings (Clr Crk Canal)
Water Flow and	Continued Adverse	Decreased Sediment	Decreased Sediment	Decreased Sediment

Quality Soil and Geologic Resources	Sediment Load Continued Soil Loss	Load Decreased Soil Loss	Load Decreased Soil Loss	Load Decreased Soil Loss
Air Quality	No Impact	Negligible Impact	Negligible Impact	Negligible Impact
Anadromous Fish & Threatened and Endangered Species	Continued sediment fowling of spawning beds	Decreased sediment fowling of spawning beds	Decreased sediment fowling of spawning beds	Decreased sediment fowling of spawning beds
Sensitive Plant Species and Exotics	No Effect	Some Exotic Spread onto Disturbed Land	Some Exotic Spread onto Disturbed Land	Some Exotic Spread onto Disturbed Land
Recreation and Visual Resources	Continued Erosion of Trails and Roads	Temporary Closure of Trails. Construction of a BLM/NPS connector trail. Visual resource improvements where practical	Temporary Closure of Trails, no Access to Removed Roads. Visual resource improvements where practical	Temporary Closure of Trails, no Access to Removed Roads. Construction of a BLM/NPS connector trail. Visual resource improvements where practical

Statement of Findings

Adhering to the stipulations outlined in the description of the preferred alternative and discussed in the impacts section results in the finding of no adverse affect to historic properties. Whiskeytown NRA is providing the Redding Rancheria, State Historic Preservation Office, and NPS Regional Office the opportunity to comment on strategies presented in this document to identify and assess potential impacts, and to negate, minimize, or mitigate the effects of the undertaking on historic properties. These strategies ensure this document meets the requirements of applicable Federal law (The National Historical Preservation Act, as amended) and regulations (36 CFR Part 800). There is no impairment of Cultural Resources under these alternatives.

Consultation, Coordination and Compliance

This environmental assessment was prepared in accordance with the National Environmental Policy Act, and NPS Director's Order 12 to determine whether the proposed work has the potential to significantly affect the environment. National Park Service staff met at Whiskeytown National Recreation Area to identify planning issues, potential impacts and other legal responsibilities associated with the proposed watershed and trail improvements in the Orofino and Salt Creek watersheds.

The Watershed Restoration and Trail Improvement project has initiated consultation with the Army Corp of Engineers for wetland impacts, National Marine Fisheries Service for salmonid impacts, Bureau of Land Management for trails system connections, California State Historic Preservation Office for impacts to historic sites, and local Native American Tribal consultation (Redding Rancheria and The Wintu Tribe). A copy of this environmental assessment will be provided to these other agencies and organizations for review. No work will be performed until all pertinent legal responsibilities are met.

Public scoping was conducted at two park- sponsored public meetings. At a park open house meeting on March 6th, some members of the public asked about the trails network in the park in general and a connector trail to BLM trails in particular. Formal public scoping for this project occurred on March 19, 2003. Both meetings were advertised in the local media, including the local newspaper. A number of valuable comments on the project were raised, including visual resource improvements and impacts, access concerns and interest in connecting to the BLM trails network. Other comments regarding the improvement of other trails in the park were recorded and are being addressed by park management. These comments were generally related to more rigorous management and maintenance of park trails (signage, improvements, and additional trail needs).

This environmental assessment is being made available for public comment for thirty days. After that time the park superintendent will recommend an alternative to the National Park Service Regional Director for approval. If no significant environmental impacts are identified during the public comment period a *Finding of No Significant Impact* document will be prepared and signed by the Regional Director, and project work may commence. Park staff would like to thank those individuals who participated in public scoping and provided comments for this document.

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Appendix I. Hydrologic Crossings on Clear Creek Canal Trail for Excavation

Crossing	Treatment	Volume of Fill (Yards³)
8+58	Excavation	20
12+08	Excavation	10
16+32	Excavation	30
21+12	Excavation	8
24+42	Excavation	5
29+74	Excavation	10
30+00	Excavation	15
31+85	Excavation, possible culvert installation	20
34+52	Excavation	15
37+83	Excavation	10
40+77	Excavation	10
44+01	Excavation	50
45+89	Excavation	20
47+03	Excavation	10
51+36	Excavation	50
57+72	Excavation	30
78+44	Excavation, possible no work	20
80+92	Excavation, possible no work	15
87+08	Excavation, possible no work	20
93+60	Excavation	30
102+10	Excavation, possible no work	10
103+45	Excavation	10
105+82	Excavation	15
108+41	Excavation	10
114+45	Excavation	15
115+13	Excavation	10
115+91	Excavation	50
117+34	Excavation	10
28 Sites	Total Fill Excavated	528 Yards ³

Appendix II. Failures on Clear Creek Canal Trail for Reconstruction

Failure	Treatment	Volume to Fill (Yards³)
3+24	Failure/Reconstruction	100
19+57	Failure/Reconstruction	3
25+71	Failure/Reconstruction	15
26+03	Failure/Reconstruction	20
36+17	Failure/Reconstruction	10
41+31	Failure/Reconstruction	10
50+60	Failure/Reconstruction	20
53+09	Failure/Reconstruction	5
73+42	Failure/Reconstruction	5
95+33	Failure/Reconstruction	10
105+18	Failure/Reconstruction	5
106+45	Failure/Reconstruction	3
12 Sites	Total Reconstruction Fill	206 Yards³

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